

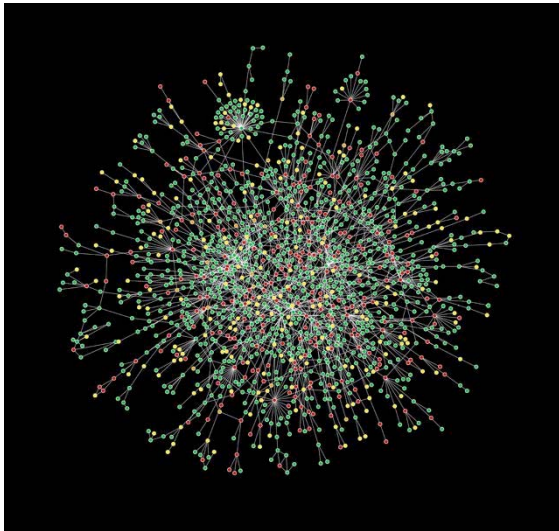


**SystemsX.ch**  
The Swiss Initiative in Systems Biology

# Newsletter #9

## April 16<sup>th</sup> 2007

### New Glue Projects and Nodes for SystemsX



The expanding universe of SystemsX.ch. Foto keystone

**Zurich.** AK. SystemsX is growing steadily. Last week, the Partners' Meeting of SystemsX fully approved two Glue Projects (GP) and one Scientific Node (SN). The decision was based on the recommendations by the extended research commission FK+ of the ETH Zurich, which reviewed five proposals for SystemsX Glue Projects and two Scientific Nodes submitted by the deadline of January 2007. Another two Glue Projects and one Scientific Node will receive a start-up funding.

**GP-CISD** (Center for Information Sciences and Databases). Systems Biology needs a strong IT backbone. Therefore, CISD was launched already two years ago. After start-up funding, a revision and resubmission of the proposal, CISD was approved by FK+ and EC meeting (see also article about preventing a Tower of Babel in Systems Biology in this newsletter).

**SN-CPHD** (Center for Cell Plasticity and Stem Cell Biology in Health and Disease). The goal of CPHD based at University of Basel and the Friedrich-Miescher-Institute is to use mice as a model system for de-

coding of the molecular basis of cell plasticity. By comparing three different tissue systems, CPHD aims to deduce whether or not there are common rules for epigenetic controls of pluripotency. Some 20 research groups are involved.

**GP-BSF** (Biomolecular Screening Facility). The Biomolecular Screening Facility (BSF) at the EPF Lausanne, School of Life Sciences (Faculty des sciences de la vie, FSV), is a multidisciplinary laboratory created for performing high throughput screening in life sciences-related projects. The main mission of this versatile platform is to be active in the fields of Functional Genomics and Chemical Biology for contributing to the discovery of biologically-relevant molecular probes and new diagnostic and therapeutic avenues. EPF Lausanne has committed substantial resources already to the construction of the facility. The project is closely related to the RISC/LMC project at ETH Zurich. SystemsX needs this capacity and therefore recommends the project.

The following projects will be partly funded:

**GP-MOP** (Center for Model Organism Proteomes). MOP aims to generate proteome maps of the model organisms *Drosophila*, *C. elegans*, *Arabidopsis* and mouse. It will improve genome annotation based on these proteomes, develop and use technologies and tools for future quantitative analyses of proteomes. Emergent technologies are applied in external collaborations.

**SN-SBOB** (Center for Systems Biology of Biomembranes). The mission of C-SBOB is to advance the understanding of regulation of lipid metabolism in health and disease, of membrane organization and trafficking, and of the interplay between

membrane compartmentalization and signalling. Main objectives are the determination of cellular and subcellular lipid composition, the identification of genes involved in maintaining this composition, the determination of the trafficking routes of lipids, and the mathematical modeling of these pathways.

**GP-MAB** (Center for Molecular Analysis and Bioinformatics). High throughput and high content analytical technologies and bioinformatics processing and interpretation of data are essential components of Systems Biology. The goal of the Center for Molecular Analysis and Bioinformatics (C-MAB) as a glue project (GP) of Sys-

temsX is to provide the scientific nodes (SNs) and other GPs with the necessary analytical infrastructure, data management and analysis capacities in "omics" technologies and bioinformatics. Several projects are organized in a decentralized manner. Some parts are of urgent need for SystemsX and there is agreement that providing capacity and access to advanced technologies is a prime mandate of SystemsX.

The Partners Meeting decided to not approve this Glue Project as a whole, but to fund particular items upon requests from SystemsX Glue Projects or Scientific Nodes.

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## SystemsX.ch: Soon ready to be launched

**Switzerland.** AK. Currently, a new contract is being drafted based on the existing SystemsX Gesellschaftervertrag. By the end of May / beginning of June 2007, the State Secretary for Education and Research, Charles Kleiber, will organize a kick-off meeting with the Rectors/ Presidents of the seven involved institutions to officially launch SystemsX.ch. Following an ambitious schedule, the new contract of SystemsX.ch shall be signed in June 2007.

SystemsX was established on the basis of cooperation between ETH Zurich and the Universities of Basel and Zurich. In 2006 it was decided to launch a new Swiss initiative in Systems Biology, which joins the efforts of seven universities under the name SystemsX.ch. EPF Lausanne joined SystemsX in June 2006 and the Universities of Geneva, Lausanne and Berne submitted letters of intent.

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## Dirk Bumann joins Biozentrum



**Basel.** thm. Dirk Bumann will start the Biozentrum of University of Basel as Associate Professor for Infection Biology by May 2007. He will be part of the SystemsX Scientific Node

«Center of Systems Bacterial Infections (SBI)».

«One of the main reasons for coming to Basel was the chance to participate in SystemsX», says Bumann. He is coming from Medical University in Hannover,

where he guides a research group on mucosal infections. Bumann was born in Berlin in 1967, studied chemistry and biology at the FU Berlin and did his PHD on the photosystem of algae at Max-Planck-Institut at Martinsried Biologie in Martinsried. A postdoc led him to the Marine Biological Laboratory in Woods Hole (USA). From there he joined Max-Planck-Institute for Infectionbiology in Berlin as a group leader. In Basel and within SystemsX he wants to study metabolic networks between salmonella and infected host-organisms. He is married and a father of three girls.

## Preventing a Tower of Babel in Systems Biology

Adrian Honegger and his team are responsible for data management in SystemsX. The team is aiming to establish a SystemsX wide computational platform for the management of biological data.



Trained physicist and CISD-head Adrian Honegger imports some concepts of CERN into SystemsX

*Foto Heidi Brönnimann*

**Basel/Zurich.** «In the nineties, when I did my PhD in nuclear physics, it was already business as usual having to deal with terabytes of data, generated by one single experiment», says Adrian Honegger, head of the Center for Information Sciences and Databases (CISD). Nowadays, Systems Biology is approaching these orders of magnitude as well.

Honegger and his team, having considerable experience in data management and analysis, much of it gained in various functions also in private industry, is ideally positioned to take on this challenge. He is also not a complete stranger to biology, having engaged in a «minor» field of study in Biology II at the Biozentrum, while he was studying physics at Basel University before participating in a Master of Science in radiation biology and a postdoc in medical biophysics. This, at the time quite unusual combination of studies, in a way,

anticipated the much-hailed interdisciplinary approach of Systems Biology.

### **What Systems Biology can learn from Particle Physics**

There is another analogy with physics, other than huge quantities of data, relevant to Systems Biology. Honegger laughs when he points out that «even in the publication which dealt with the results of my own dissertation, I was not the first author, but was listed somewhere around twentieth of about a hundred of others».

Nowadays, the scientific «groups» organized around experiments with the Large Hadron Collider comprise a few thousand scientists and engineers, a situation hard to imagine in academic (systems) biology, where a completely different culture of small scientific groups persists, and where even single scientists fight for merit in the form of publications and impact factors. «This lonely culture of prey is not compati-

ble with Systems Biology anymore», says Honegger. It has to be replaced by a more collaborative system of knowledge generation, in which every member individually paints a small part of a larger, coherent picture. «In the end, this boils down to a matter of trust».

Honegger does not argue that huge, anonymous scientific groups are the inevitable consequence of work in Systems Biology, but is convinced that an innovative approach to the organization of research and its data is mandatory, if success in this highly interconnected and competitive research area is to be realized. This implies a central role of CISD within SystemsX. «Ideally, we should be involved in the design of a new experiment from its inception», suggests Honegger. «This would make data management at SystemsX more effective as the CISD team would be in a position to influence how data is generated from the beginning and thereby avoid subsequent unnecessary time and effort consuming data management reengineering tasks», Honegger adds. Furthermore, this approach allows the CISD group to build up know-how for the benefit of the whole of SystemsX.

### **Babylon is near**

Honegger weighs these «sociological challenges» as being of greater importance than the mere informatics ones. If this new collaborative culture can be implemented at this still nascent stage, then the computational models and data management approaches within SystemsX can develop into a coherent system more easily, and segregation into a growing number of non- or hardly compatible subsystems – a Tower of Babel in Systems Biology, so to speak – can be avoided. «If this happens, SystemsX won't fly in a thousand years», warns the software engineer.

Of course this Tower of Babel is a danger that lurks not only within SystemsX, but also on a global Systems Biology level where, collaboration and mutual participation is again the only sensible way to go, as the Humane Genome Project and CERN have shown. Honegger insists that therefore software development at SystemsX must not be proprietary, but must follow the route of open source projects such as Linux, GNU or Mozilla (Firefox

## **Solutions for the benefit of all**

**Zurich/Basel.** thm. For the time being, the Center for Information Sciences and Databases (CISD) comprises a group of four software engineers with two current projects. The budget for 2007 is 700k CHF. The proteomics project aims for accurate, consistent, and transparent data management and analysis, which are integral and critical parts of proteomics workflows in general and for biomarker discovery in particular. The definition of common standards for data representation and analysis and the creation of data repositories are essential to compare, exchange, and share data within the community.

The second project will be worked on in close collaboration with the RNAi imaging glue project from the Light Microscopy Center of ETH Zurich. RNA interference has re-energized the field of functional genomics by enabling genome-scale loss-of-function screens in cultured cells, producing a variety of data that describe the state of an organism or cells as they change with time (cellular phenomics). The Phenomics-project of CISD, therefore addresses an automation of RNAi imaging and classification of RNAi phenotypes. The aim is the establishment of a cellular phenomics database, a central RNAi phenotype repository and corresponding query functionality.

browser). Only then fruitful collaborations can take place, as for example with the renowned Institute of Systems Biology in Seattle and other top institutions in Systems Biology or data management. «If we insist on proprietary technology, we become less interesting as a partner as our resources and expertise can't be leveraged effectively», warns Honegger.

And, by the way, the World Wide Web would not be what it is today if CERN, where the web was invented, had protected it with intellectual property – or would it?  
*Thomas Müller*

## UK and Swiss Systems Biology cooperate

**London/Zurich.** AK. SystemsX.ch and the six UK centers of excellence in Systems Biology are planning an exchange program for PhD students and post-docs. Recently, Lutz-Peter Berg of the Swiss Embassy in London and Bernhard Sander of the UK Embassy in Switzerland visited SystemsX.ch members to discuss the possibilities of collaboration between SystemsX.ch and the UK Biotechnology and Biology Research Council (BBSRC).

It is planned for an equal exchange of full time equivalents (FTE) where 3 to 5 post-docs and/or PhD students will be supported over three years. The participants of the program shall be selected on a competitive basis and will be required to spend significant research time in either country to catalyze research interactions.

SystemsX.ch welcomes the program; however, details on funding, the process

of application, reviewing, etc. have yet to be negotiated. The UK partners will propose a letter of intent.

The initiative was proposed by UK Science Minister Lord Sainsbury and Swiss State secretary for Education and Research Charles Kleiber in 2006.

Switzerland is not the only country, BBSRC is cooperating with. A joint call with the French Agence Nationale de la Recherche (ANR) for collaborative proposals to encourage the development of cross-national research projects in the Systems Biology of animals, plants and micro-organisms just closed last week.

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**More information:**

<http://www.bbsrc.ac.uk/science/initiatives/sabr.html> and  
[http://www.bbsrc.ac.uk/science/initiatives/anrbbsrc\\_sysbio.html](http://www.bbsrc.ac.uk/science/initiatives/anrbbsrc_sysbio.html)

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## Sysmo starts with eleven projects



**Jülich.** thm. SysMO, a 28 M Euro European transnational funding and research initiative

on «Systems Biology of Microorganisms», started in March with 11 projects, one with three SystemsX scientists on board.

The goal pursued by SysMO is to record and describe the dynamic molecular processes going on in unicellular microorganisms in a comprehensive way, and to present these processes in the form of computerized mathematical models.

SysMO is financed by the partner countries Austria, Germany, The Netherlands, Norway, United Kingdom and Spain. They have issued a joint communiqué in August/September 2005 and provide funding for transnational projects. SysMO is coordinated by Germany.

Eleven out of 32 collaborative projects have been selected for funding within SysMO. Working groups from the six partner countries Austria (2), Germany (29), Norway (7), Spain (9), The Netherlands (15) and the United Kingdom (22) as well as from the Czech Republic (1), France (2) and Switzerland (4) contribute their experience and knowledge. The projects are covering different fields of interests and will be supported by the partner institutions with appr. 28 M €.

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## How to keep the body in sync

**Lausanne.** thm. The stability of human cellular clocks depends on the phosphorylation and transcription rates of a specific gene. In an article in the journal *Molecular Systems Biology*, researchers from the Ecole Polytechnique Federale de Lausanne use the tools of physics to show how our circadian clocks manage to keep accurate time in a noisy cellular environment.

Using mouse fibroblast circadian bioluminescence recordings from the Lab of Ueli Schibler at the University of Geneva, the researchers turned to dynamical systems theory and developed a mathematical

model that identified the molecular parameters responsible for the stability of the cellular clocks. Stability is a measure of how fast the system reverts to its initial state after being perturbed.

The results are consistent with recent research from the University of California, San Francisco involving families whose circadian clocks don't tick quite right.

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**More information:**

Dr. Felix Naef

[http://www.isrec.ch/research/groups/research\\_groups\\_detail\\_eid\\_1696\\_lid\\_2.htm](http://www.isrec.ch/research/groups/research_groups_detail_eid_1696_lid_2.htm)

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## Upcoming events

Date	Location	Topic
April 22-23 2007	Seattle, USA	<a href="#">ISBs International Symposium - Systems Biology and the Environment</a>
May 3-6 2007	Heidelberg, Germany	<a href="#">EMBO Conference on Chromatin and Epigenetics</a>
June 24-27 2007	ETH Zurich, Switzerland	<a href="#">Synthetic Biology 3.0, ETH Zurich</a>
July 12-14 2007	Nashville, Tennessee, USA	<a href="#">Building a Better Mouse II at Vanderbilt University</a>
September 6 2007	Kuala Lumpur, Malaysia	<a href="#">International Conference on Mathematical Biology 2007 (ICMB07)</a>
September 10-12 2007	The New Forest, UK	<a href="#">Seventh International Conference on Modelling in Medicine and Biology</a>
September 13-14 2007	Buxton, Derbyshire, UK	<a href="#">17th New Phytologist Symposium Systems Biology and the Biology of Systems: how, if at all, are they related?</a>

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## Imprint

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